CTIS 164 - Technical Mathematics with Programming

Homework #3 (15%)

Deadline: 8 May 2022, 23:55
Grouping: No grouping, individual work (do not copy code - any part of a friend's program)
Submit: Through moddle system
Material for submission: only C source code as *YourSurname_Name.cpp, DO NOT SEND all project files, Only file with CPP extension. Otherwise, you will lose **10pts**.*

Subject: You will implement a "Chasing the mouse pointer using Trigonometry and Vector Algebra." Video clip of a sample homework is provided on the moodle page.

Important Note: The scene shown in the video is given as just an example. You have to design your own screen and your own animation (your own background, moving objects, etc.).

Minimum requirements: 80 Points

1. (20pts) Screen Design Animation will be performed in a rectangular area. Outside this area, display:

- a proper message about the purpose of the program and your name as the title of the window,
- your name (and surname) as a label,
- a text stating whether the mouse pointer is inside the rectangular animation area or not,
- the angle of the complex object,
- a directive to pause or restart the animation.

2. (20pts) Animation Area Inside the rectangular area, display:

- a small circle at the position of the mouse pointer (it should not be displayed when the mouse pointer is outside the animation area),
- a complex object (which is not composed of only circles and line segments).

3. (30pts) Complex Object must animate in the rectangular area with the following rules:

- If the mouse pointer is inside the animation area, complex object should chase it. To draw the complex object with the correct angle, you need to use the vertex function, which is used to apply two transformations (rotation and translation).
- If the mouse pointer is outside the animation area, it should move in its last direction (with its last angle). If it hits one of the walls of the rectangular area, it should bounce off with the correct angle.

4. (10pts) Pause/Restart The user should be able to pause or restart the animation.

Bonus After completing these basics, you can make any improvements to your program as you wish. You will get bonus points according to your creativity and your programming skills. But, you have to list these improvements in the beginning of your source code as comment lines. Additional functions that are not reported in the source code, will not get any bonus points.

Restrictions:

- Use “vec.h” and “vec.cpp” header files that are available on the moodle page.
- Do not copy vector functions (content of “vec.cpp” file) into your source code. Use #include “vec.h”. Upload only your source file that does not contain vector implementation.
- Do not use Matrix operations!
- Do not create a window larger than 1400x800 pixels.

Important Notes:

- Name your source code as `YourSurname Name.cpp`.
- At the beginning of your source code include a comment block containing your name, student number, section, problems in your program and additional functionalities, if any. If your program does not meet the minimum requirements, explain them in the PROBLEMS section of the given template source code.
- Use comment lines in your program.
- Do not upload all project files. Do not upload a zip file. Upload only your source code with `.cpp` extension.
- Your grade will be reduced, if you don’t follow the above rules!
- Source codes that do not compile and run on the lab computers, will not be graded! It is the student’s responsibility to check any compatibility problems before uploading onto moodle.
- If you miss the deadline you can send your source code via e-mail within 24 hours of the deadline. But your grade will be reduced by 40 percentage points.
- Materials sent later than 24 hours after the deadline, will not be graded.
- Sample video is given as just an example. You have to design your own screen and your own animation (your own scene, moving object, etc.).
- Do not copy any part of a friend’s program. You can share ideas but not code. Sharing any part of C source code leads to grade 0.

Enjoy your coding :-)
Okyay SAY